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tively on the sun (always using a smoked glass, or something equivalent) for a minute, and sometimes for several minutes, and the probability is that a spot, which at first could not be seen, will become visible.—Communicated by PROF. D. TROWBRIDGE.

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QUERY.—The strain on the internal surface of a steam boiler tending to produce longitudinal rupture, is, per unit of length, equal to the product of the elastic pressure of the steam per unit of surface multiplied by the diameter of the boiler. What should be the relative thickness of the flat ends of a boiler, so that, without bracing, they are just strong enough to withstand the maximum strain that the boiler will bear?

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PROBLEMS.

11. Borrowed a sum of money at 8 per cent. simple interest and loaned it out again at 5 per cent. compound interest; in what time will I gain the amount borrowed?—Communicated by E. W. FOSDICK, Eso., Butler, Indiana.

12. Given the base AC of a triangle and the ratio of AB to BC to find the locus of the point B by Geometry.—Communicated by L. REGAN, Boonsboro, Iowa.

13. A body is projected at a given distance from the center of force with a given velocity, and in a direction perpendicular to that distance: When the force is repulsive and varies inversely as the cube of the distance, find the path of the body:—Communicated by J. B. SANDERS, Troy, Indiana.

14. Two equal particles attracting each other with forces varying inversely as the square of the distance, are constrained to move in two straight lines at right angles to each other; supposing their motions to commence from rest, to find the time in which each of them will arrive at the intersection of the two straight lines.—Communicated by PROF. J. M. GREENWOOD, Kirksville, Mo.

15. Two points are taken at random in the surface of a given circle and a chord drawn through each at random; show that the chance that the chords intersect is

$$\frac{1}{3} + \frac{5}{2\pi}.$$

—Communicated by E. B. SEITZ, Greenville, Ohio.